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EDITORIAL

A Light in the Shadows of Carotid Artery Stenting

Long-awaited results from the CREST (Carotid Revascularization Endarterectomy versus Stenting Trial) study have been recently presented[1] and gave a new light on carotid endarterectomy (CEA) and carotid stenting (CAS).

CREST compared CAS to CEA for the treatment of carotid artery stenosis to prevent stroke in symptomatic and asymptomatic patients. More than 2500 patients were enrolled from more than 100 centers in North America and Canada over a 9-year period. The occurrence of the composite primary end-point of any stroke, myocardial infarction, or death during the periprocedural period or ipsilateral stroke on follow-up, was not significantly different in CEA and CAS groups: stenting 7.2%, surgery 6.8%. The overall safety and efficacy of the two procedures was largely the same with equal benefits for both men and women, and for patients with and without previous neurological symptoms. However, there were more heart attacks (2.3%) in the surgical group compared to 1.1% in the stenting group, and more strokes in the stenting group (4.1%) versus 2.3% for the surgical group in the weeks following the procedure. In particular, few strokes were disabling; the rate of non-disabling stroke was 2.7% for CAS vs. 1.4% for CEA, and the rate of disabling stroke was 1.4% for CAS vs. 0.8% for CEA, without achieving statistical significance.

With these new data from the CREST trial we can finally re-evaluate the right place for CAS with respect to CEA. CREST results highlight some important messages to a critical reader.

The first consideration is that CREST outcome rates are the lowest yet reported in any randomized trial on CAS. This can be explained since CREST was the only trial to include asymptomatic and symptomatic patients and to require only well-trained operators before randomization. Besides the enrollment of low-risk population, there is no doubt that the acceptable complication rates from CREST are the consequences of significant advances in technology, operators' experience, and patient selection for stenting, that have continued over the 8-year enrollment period. Notably CREST was the only trial to have a lead-in phase to train less experienced operators prior to the enrollment start.[2]

The second message is that these results cannot delete the findings of previous RCTs, which provided opposite and negative figures for CAS. The three most recent trials, the Endarterectomy Versus Angioplasty in Patients with Symptomatic Severe Carotid Stenosis[3] (EVA-3S) trial, the Stent-Protected Angioplasty versus Carotid Endarterectomy[4] (SPACE) trial, and the International Carotid Stenting Study[5] (ICSS) have indeed supported the notion that CEA is safer than CAS. Since the appearance of these unfavorable data for stenting, many of the original CAS enthusiasts have expressed a note of caution[6] and the need to select patients more carefully. In the CREST study half of the population was asymptomatic (47%, equally distributed in CAS and CEA groups) justifying for an overall decreased procedural risk compared to the other recent RCTs. Nevertheless, even though detailed CREST data stratified by symptoms are still unknown, CREST investigators claimed that their risk rates were equally distributed between CAS and CEA in both symptomatic and asymptomatic patients.

The third message is that CREST results did not aim to establish whether stenting or endarterectomy will win the race, but more likely how these two procedures could be selectively and properly applied to individual patients. Depending on patient's characteristics, one procedure might have an advantage over the other. In an interaction analysis, CREST found that stenting results were slightly better for patients aged 69 and younger, with the benefit increasing with decreasing age. Conversely, for patients older than 70, surgical results were slightly superior to stenting, with the benefits increasing along with the age.

This is the first example that stenting and endarterectomy could both have their place as different treatment options for carotid stenosis and could complement each other, with positive or negative effects in certain patient subgroups, which need to be further identified (i.e. vessel morphology, gender, presence or absence of previous symptoms, and time of onset of previous symptoms). In recent years an increasing number of papers tried to define risk scoring systems in order to improve CAS results according to different patient populations.[7,8]

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Finally, CREST results allowed experienced operators in both techniques to adapt a treatment strategy tailored to each patient. To this regard, only specialists who can offer both options of treatment will offer the greatest benefit for the patient.

Although CREST cannot solve all the issues raised by other trials on CAS,[9] and a number of ongoing RCTs are awaited before a final decision, it is time to suggest that both CAS and CEA could serve as valid treatment options with similar safety in the treatment of carotid stenosis.

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C. Setacci*

Department of Surgery, Vascular and Endovascular Surgery Unit, University of Siena, Viale Bracci, 53100 Siena, Italy

*Corresponding author.

E-mail address: setacci@unisi.it

P. De Rango

Vascular and Endovascular Surgery Unit, Ospedale S. Maria della Misericordia, University of Perugia, Perugia, Italy

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